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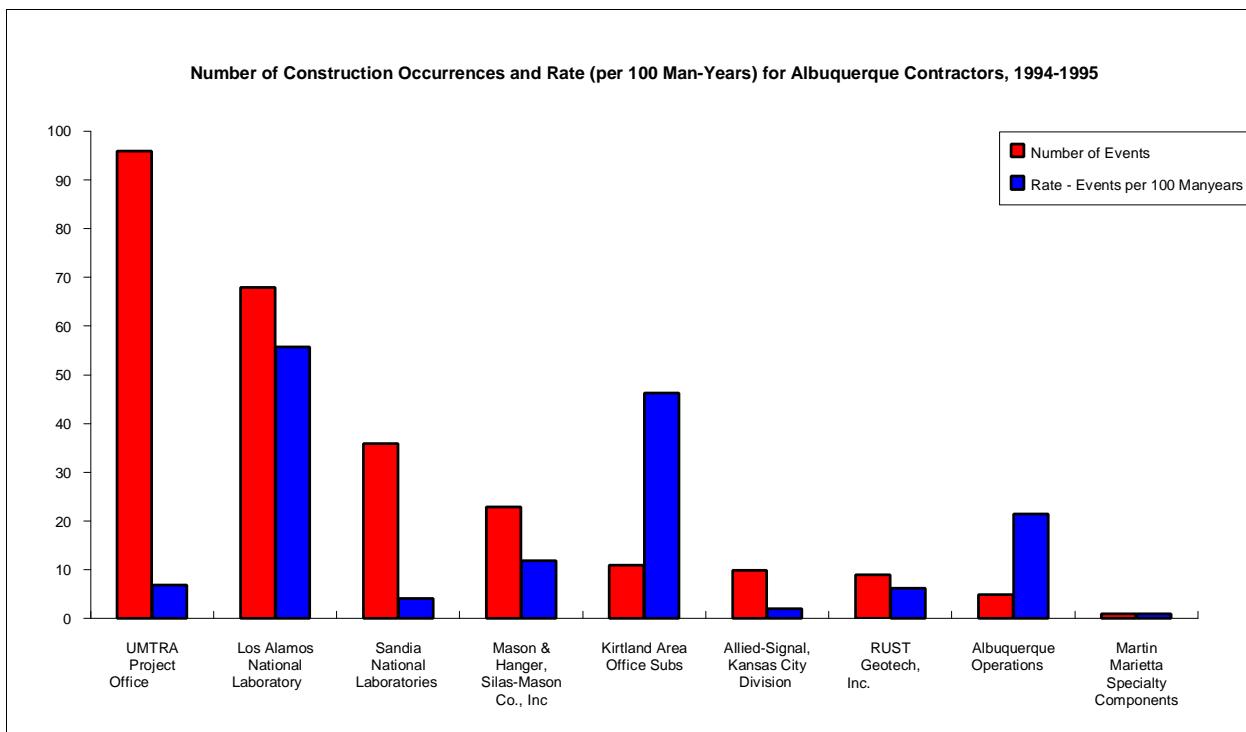
NORMALIZATION OF DATA

ISSUE:

Current methods of analyzing environment, safety and health performance of Department of Energy facilities use numbers of reportable events, radiological contaminations, or radiological exposures. These do not consider the level of activity at facilities, so differences in the numbers of events do not necessarily indicate differences in performance. Falling numbers of reportable events at a facility may indicate improving safety, or may reflect reduced activity and fewer opportunities for mishaps. When numbers of events are divided by a measure of the facility's activity or exposure, "normalized" safety performance, or *rates* result.

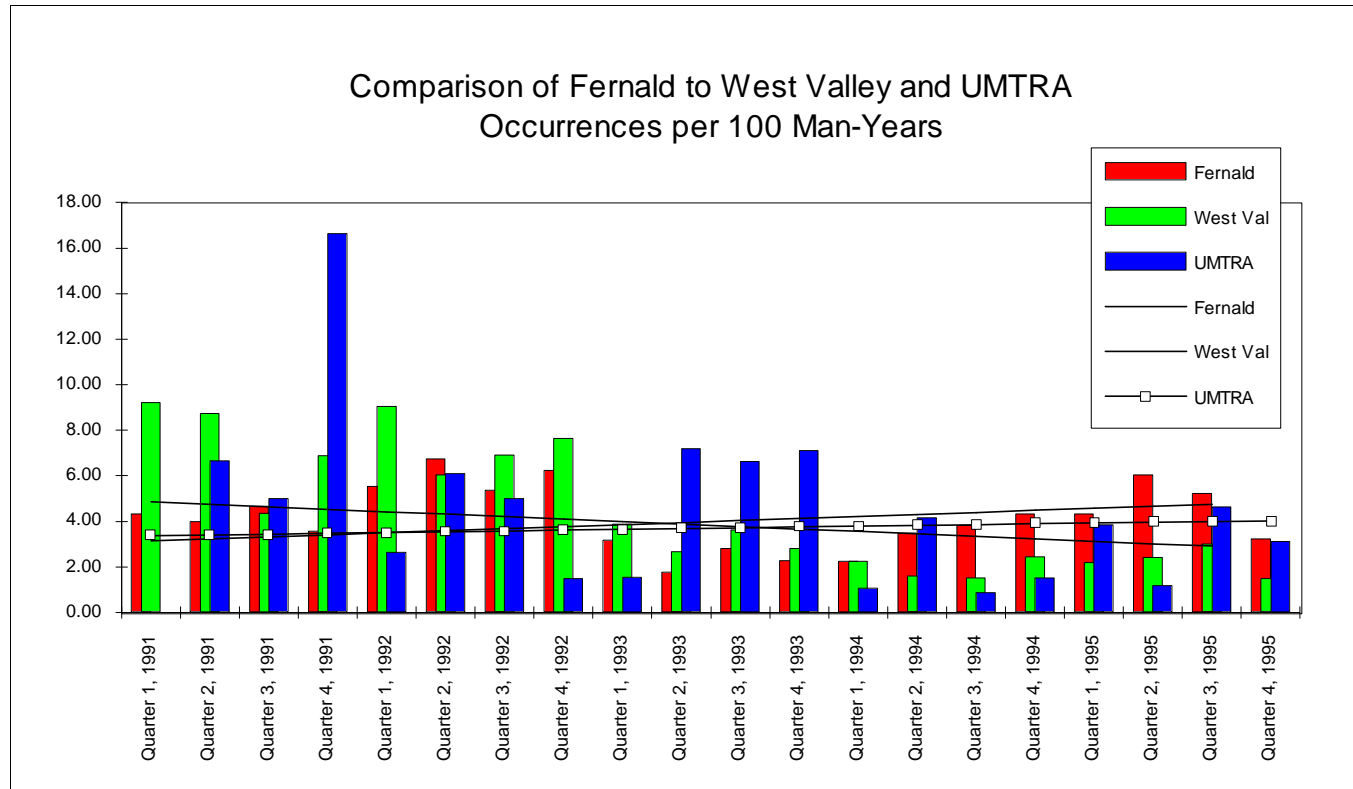
EXAMPLES:

This chart shows 1994-95 construction events from the Occurrence Reporting and Processing System (ORPS) normalized by construction work hours from the Computerized Accident/Incident Reporting System (CAIRS) for facilities reporting to the Albuquerque Operations Office.



The *number* of events shows Uranium Mill Tailings Remediation Activities (UMTRA) with the “worst” performance; but the *rate* of events per 100 person-years worked shows that UMTRA was up to five times “better” than four other activities.

This chart of five years of data shows the rate of all occurrences per 100 person-years worked, and the calculated trend, at three activities: Uranium Mill Tailings Remediation Activities (UMTRA), the West Valley project, and the Fernald Environmental Management Project.



The three projects are different sizes, but all are engaged in roughly similar work in decontamination and decommissioning. Normalized data allows comparisons among the projects, and shows they have roughly equal occurrence trends (steady) although their rates and numbers are different.

DISCUSSION:

The Office of Operating Experience Analysis and Feedback researched ways to measure the level of activity at Department facilities. This data is vital for analysis of safety performance, prediction of problem areas, and establishing corporate safety and health performance indicators. Normalized data would be comparable across different facilities and over time. We contacted many DOE organizations and held a Normalization Forum in December, 1995. We found that normalization data is scarce, and safety professionals across the Department acknowledge its usefulness and desire improvements in its collection.

WHAT'S AVAILABLE:

Only two sources of normalization data are readily available at headquarters, and both have significant limitations.

- The EH-5 Computerized Accident/Incident Reporting System (CAIRS), collects quarterly person-hours worked and reportable injuries, categorized by contractor and major function. It is used mainly to generate Bureau of Labor Statistics reports. Limitations: has only major functional area breakouts; hours worked do not necessarily reflect actual production or activity.
- The Office of Human Resources (HR-53) Industrial Relations Reporting System (IRRS), collects semiannual data on personnel hours, and costs categorized by program, contractor, and labor relations categories. It is used mainly for cost accounting. Limitation: data collected semiannually; categories do not align well with facility functions; data may not reflect actual production.

Both CAIRS and IRRS report hours worked, which may not accurately measure a facility's "activity." For example, operations at the Y-12 site were curtailed in September, 1994, but hours worked remained nearly constant. Much activity at Y-12 shifted from production to training and procedure development and review. A better measure of activity for Y-12 might be the number of nuclear material transactions, indicating movements and operations. This data was difficult to obtain, since it is scattered in logbooks at several organizations. Staff of the Oak Ridge Y-12 Site Office was very helpful in locating the information, but since it is not centrally collected or kept in a retrievable system, they had to review log books for representative periods and extrapolate for annual totals.

PATH FORWARD:

- **IMPROVE EXISTING DATA COLLECTION:**

CAIRS, with small modifications, could provide better normalization data for analysis.

- Inclusion of Standard Industrial Codes in the data set, now under consideration, would help.
- Coordination of labels for organizations between CAIRS and ORPS would also provide better correlation between data.

- **FIND MORE NORMALIZATION DATA:**

DOE facilities may collect data that could serve for normalization. Examples:

- number of radioactive contamination area entries
- numbers of nuclear material movements
- number of hours worked in hazardous exposure areas
- cubic yards of decontamination and decommissioning material removed
- number of maintenance work packages opened and hours worked on each
- dollars expended
- number of units processed (where 'units' depends on the specific process)

All these and more may be available, but the need for normalized data is not recognized at all levels of management. With consensus on some core normalized items and simple, low-cost collection methods, more organizations would use normalized data and the resulting analyses would be more useful in safety improvement. This will require high-level agreement to collect and use normalization data, and wide involvement and buy-in to design effective collection systems and procedures.

- **INFLUENCE DOE MANAGERS TO DEMAND NORMALIZED DATA:**

- Provide more normalized analyses in lessons learned, point papers, and other media whenever the opportunity arises
- Participate in working groups to educate and influence managers in the usefulness of rates versus absolute numbers

- Performance Measures Coordination Team
- Chief Financial Officer re-engineering working group
- EH and DOE Quality Councils